TO: Internet Address: rcra-docket@epa.gov

RE: **RCRA Docket #RCRA-2002-0033**
Draft Guidance For Evaluating The Vapor Intrusion to Indoor Air Pathway From Groundwater and Soils

DATE: February 28, 2003

RCRA DOCKET: Docket ID No. RCRA-2002-2003

Please find enclosed the Ohio Environmental Protection Agency's comments on EPA's draft guidance addressing the evaluation of the vapor intrusion pathway. This notice was issued November 29, 2002, in the *Federal Register* (Vol. 67, No. 230, pg. 71169).

Ohio EPA requests that these comments be made an official part of the record. If you have any questions or need additional clarification regarding the enclosed comments, please do not hesitate to contact Stephanie Beak, Ohio EPA, Division of Hazardous Waste Management, 122 S. Front Street, Columbus, Ohio 43215 at (614) 644-4852 or stephanie.beak@epa.state.oh.us.

cc: Michael A. Savage, Chief, DHWM
Dave Sholtis, Assistant Chief, DHWM
Stephanie Beak, ERAS, DHWM
Karen Hale, RIS, DHWM
Ed Tormey, Legal
DHWM CO/DO Managers

1) Section (I)(B), (I)(C), (I)(D), (IV)(D): Overall comment about the guidance scope

Although in one section of the draft guidance it states that its suggested use is for RCRA Corrective Action, CERCLA, and Brownfields sites, the scope seems to be effectively narrowed to EI determinations based on the wording of other sections. It is especially confusing the fact that the guidance is not designed for "assessment of current and future risks at NPL sites..." and "is not designated to be used during the process for determining whether, and to what extent, cleanup action is warranted at these sites." Ohio EPA suggests that the scope and applicability of the guidance be unambiguously stated in one section of the guidance rather than unfolding over a number of different sections. Due to the ultimate intention of site cleanup for the programs listed in the guidance, it would be helpful to link the methodology in this guidance to the steps necessary to achieve site cleanup.

It would be especially helpful to provide guidance on how to use the Johnson and Ettinger Model (or other models) to arrive at cleanup levels that are protective of the vapor intrusion pathway. Ordinarily published cleanup levels are created for both soil and groundwater. Therefore, efforts to relate the protection of this pathway back to soil concentration levels would be beneficial. In addition, in absence of published cleanup levels based on the vapor intrusion pathway, there is a potential for facilities to want to use the target media specific concentrations as cleanup levels.

Although the draft guidance is clear that it was not created with the RCRA Closure Program in mind, there is still a need for guidance on how to evaluate the vapor intrusion pathway in a way that is appropriate for the RCRA Closure Program.

2) Section (I)(D)(1): Occupational settings where persons are in a working situation

This section states that OSHA will take the lead on protecting against workplace exposures from vapor intrusion rather than accounting for industrial receptors as part of evaluating the vapor intrusion to indoor air pathway. For the regulated facilities applicable to the guidance, the vapor intrusion pathway should be considered in addressing occupational exposures even where workers are the only potential receptors. Ohio EPA asks facilities to evaluate all receptors, including workers, and all complete pathways through which the worker is exposed to chemicals. It is part of our mission to protect human health and industrial workers are not excluded from that. Although we are aware that the Occupational Safety and Health Administration (OSHA) regulations exist to protect workers, as stated

in the guidance, “employees and their employers may not be award of subsurface contaminants that may be contributing to the indoor air environment of their workplaces, particularly since vapor intrusion may include constituents that are no longer or were never used in a particular workplace, may originate from elsewhere, or be modified by bio-degradation or other subsurface transformation processes.” This lack of awareness is confounded by facilities changing owners or operators over time. It is our recommendation that EPA requires that the industrial worker be accounted for in the vapor intrusion to indoor air pathway evaluation.

3) Section (III)(C): Tier 2 - Secondary Screening

Ohio EPA has two issues in regard to this part of the text. First, the guidance states that “the site risk manager may choose to select media-specific target concentrations for screening at three cancer risk levels: 10^{-4}, 10^{-5}, and 10^{-6}...” Ohio EPA would like the guidance to address how the site manager should determine which level of risk is appropriate for a given site, with very select and restrictive criteria for the 10^{-4} end of the range. Please be aware that Ohio EPA does not agree that a 10^{-4} risk level, per chemical, is an appropriate level to use for screening constituents, regardless of the conservativeness inherent in the screening values.

The second issue with this section is with the last statement in the “secondary screening” paragraph which reads, “When results from secondary screening do not support a determination that the pathway is incomplete, we recommend the user proceed to the Site-Specific Pathway Assessment.” This sentence is written in an unclear manner and seems to conflict with another part of the guidance. Adequate data utilized in this tier when compared to the target media-specific concentrations may indicate that the pathway is incomplete and/or does not pose an unacceptable risk to human health (as stated on page 33). The pathway may be complete, and yet the guidance user still does not need to proceed to Tier 3 because the media concentration data is below target values and therefore do not pose an unacceptable risk to human health. It would be more clear to change the sentence to the following, “When measured or reasonably estimated media concentrations exceed the target media-specific concentrations given in Tier 2, we recommend the user proceed to the Site-Specific Pathway Assessment.”

4) Section (IV)(D): How Will This Guidance Be Used In The RCRA And CERCLA (Superfund) Programs?

There is a typo in footnote 2. In both the third and fourth sentences, the word “additively” is used. The appropriate word is “additivity”.

5) Section (IV): Figure 2. Schematic flow diagram: evaluation process recommended in guidance.

Although Ohio EPA appreciates EPA's efforts to offer a pictorial schematic to help the guidance user visualize the logical approach of the guidance, we would like to make a number of suggestions regarding this figure in an effort to increase the usefulness and readability of it. In the Tier 1 box, Questions 1 through 3 are not labeled, and should be to maintain formatting consistency. Also, it is hard to find Tables 1 through 3 without a reference to their location within the document. It would be useful to add information about the location of these tables (they are in the last appendix of the document).

In the Tier 2 box, a footnote needs to be added under the second bullet of Question 4 that states EPA's position that using soil contaminant concentration data exclusively is not appropriate for assessing the vapor intrusion pathway. For the last bullets for both Questions 4 and 5, the wording should be modified from "incomplete" to "not significant" (see comment 2 of this letter).

Based on the second bullet in the Tier 3 box, it appears as though the exposure pathway completeness cannot be determined without sub-slab or indoor air sampling. If a building is not present currently, but future use is unknown or unlimited, this type of sampling is not possible. In the textual description of Tier 3 (Section VI, Tier 3, Site-Specific Assessment), this case is addressed. It would be beneficial to revise this figure so that it is in agreement with the text.

6) Section (IV)(A)(1): What is the goal of this question?

This section states that "Table 1 lists chemicals that may be found at hazardous waste sites and indicates whether, in our judgment, they are sufficiently volatile (Henry's Law Constant > 10^{-5} atm m^3/mol) to result in potentially significant vapor intrusion..." We recommend that EPA use the same criteria for volatility that is used in the Risk Assessment Guidance for Superfund, which in addition to the Henry's Law Constant criterion includes the criterion that a constituent must have a molecular weight of less than 200 g/mol.

7) Section (V)(A)(3): What is in Tables 2(a), 2(b), and 2(c) and how did we develop them?

The section cites U.S. EPA's *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (2002), but this document was not published in 2002

(there was a draft version published in 2001). Therefore, the reference needs to be updated or changed.

8) Section (VI)(A)(1): What is the goal of this question?

There is a typographical error in the third sentence. The phrase "these determination" does not seem to fit into the sentence and should be modified or removed.

9) Section (VI)(A)(1), (2), and (6): Site Specific Assessment Question 6

The document seems to contradict itself in these questions. Under question 1, the document states that "EPA recommends that predictive modeling can be used to support Current Human Exposures Under Control EI determinations without confirmatory sampling...". Under question 2, titled "How should you complete this evaluation?", the document states that after conducting site-specific modeling, "If sampling confirms that unacceptable inhalation risks due to vapor intrusion do not occur at the site, we recommend that the vapor intrusion pathway be considered incomplete and/or does not pose an unacceptable risk to human health. If sampling confirms that any building is impacted on the site, we recommend that the pathway be considered complete". In question 6, titled "Why should you consider using site-specific modeling at this time?", the document states that "Where predictions and direct evidence from the indoor air sampling are consistent, the model can be used to direct the selection of buildings to be sampled".

In the first case, modeling is considered adequate to make a determination about the pathway completeness at the site. In the second case, sampling results override modeling results in regard to making a determination about pathway completeness. In the third case, modeling should only be used where supported by sampling results. It is not at all clear to the user as to what to do when the "multiple lines of evidence" approach involving both sampling and modeling results leads to different conclusions about pathway completeness. The document needs further clarification as to what to do when modeling results and sampling results conflict with one another about whether the inhalation pathway is complete.

10) Section (VII)(1): Constituents of Concern Identified?

There is a note next to the answer "no" that reads as follows: "If NO, skip to the conclusion section below and check NO to indicate the pathway is incomplete". Constituents of concern may not have been identified due to an inadequate characterization of nature and extent, and therefore no conclusions can be made about the pathway completeness. Therefore, this note needs to be rephrased, to

account for this possibility. This change will more accurately reflect the guidance given in text that can be found in Section IV, Tier 1, Primary Screening, Question #1.

11) Section (VII)(2): "Currently inhabited buildings near subsurface contamination?" and "Areas of future concern near subsurface contamination?"

The Question 2 (Q2) subheader contains two different questions: "(Are there) currently inhabited buildings near (the) subsurface contamination?" and "(Are there) areas of future concern near (the) subsurface contamination?" Per the textual description of this question (Section IV., Tier 1, Primary Screening, Question #2), the answer to both questions must be "no" in order for there to be evidence that the pathway is incomplete. The placement of the note after the second part of Question 2 is misleading (The note reads as follows: "If NO, skip to the conclusion section below and check NO to indicate the pathway is incomplete."). It appears from the note placement that only the second question must be answered "no" in order to indicate that the pathway is incomplete. Therefore, the note needs to be moved away from the second part of Question 2 and to be reworded to indicate that both questions must be answered "no" in order to indicate that the pathway is incomplete. Also, the term "areas of future concern" is not described or defined nor does it match the terminology in the textual description of this question ("areas of concern under future development scenarios"). There needs to be consistency of terms within this guidance document.

12) Section (VII): Vapor Intrusion Pathway Summary Page

Only Questions 1 through 3 are labeled, and so the remaining questions need to be identified.

13) Appendix A: Data Quality Assurance Considerations

The following sentence needs to be reworded: "OSWER expects that site-specific projects assess the impact of groundwater contaminants on indoor VOCs will be addressed by an approved Quality Assurance Project Plan (QAPP)." Either 'assess' should be changed to 'assessing,' or the word "that" should be added before the word "assess".

14) Appendix C: Secondary Screening

There are numerous references to "precluding factors" in this diagram. This term is vague and not well defined, except in the text in the body of the document. A footnote either defining the term or referring to the page where the definition is located would be helpful.

15) Appendix C: Site Specific Screening, Question 6

Several typographical errors are included in the Question 6 flowchart. Some words are missing from the sentence in box 6(a). "Pathways" is missing from the second line (should read "potential preferential pathways"), "been" is missing from the third line (should read "overlying building characteristics been adequately characterized"). Box 6(b) also contains a spelling error (applicatble) and appears to be missing some text. Box 6(d) an incorrect spelling of sub-slab ("sublab").

Also, this is the only chart with an endpoint regarding EI determinations. Since the first two tiers are used to make pathway completeness determinations, Ohio EPA would like to know if it is necessary to always progress to Tier 3 in order to make EI determinations. If EI determinations can only be made at the Tier 3 level, is it necessary to go through the first two tiers or can the guidance user just skip to Tier 3?

16) Appendix D: (3) Data Sources

Ohio EPA believes that extrapolation from the oral route is only necessary if there is information indicating that the constituent is toxic via the inhalation pathway, and there is not adequate inhalation toxicity information available. It is the opinion of Ohio EPA that extrapolation should be done on a chemical-specific basis by examining evidence of a chemical's potential toxicity or carcinogenicity via the inhalation pathway.

17) Appendix D: (5) Target Indoor Air Concentration to Satisfy Both the Prescribed Cancer Risk Level and the Target Hazard Index

The target media specific concentrations all are based on an adult residential scenario. Residential scenarios standardly account for a child's exposure. This is well documented in a number of EPA guidance documents that cover the fundamentals of risk assessment (e.g., Risk Assessment Guidance for Superfund, and Soil Screening Guidance). It is unclear why EPA did not include a child receptor as part of evaluating lifetime exposure to a hypothetical resident. Ohio

EPA suggests that the child receptor be taken into account when calculating target concentrations in order to be protective of this sensitive subpopulation.

18) Appendix D: (7) Target Groundwater Concentration Corresponding to Target Indoor Air Concentration

The technical description about the development of the media specific target concentrations includes the following statement: "If the calculated groundwater target concentration is less than the Maximum Contaminant Level (MCL) for the compound, the target concentration is set at the MCL." Defaulting to MCLs in this case is inconsistent with protection for the inhalation pathway. Based on the derivation of MCLs, it is unclear how these concentration limits will protect a receptor that is exposed to contaminated indoor air via the vapor intrusion pathway. In order to make decisions about whether this pathway is complete and/or poses an unacceptable health risk, Ohio EPA believes that risk-based concentrations should be used.

19) Appendix E: (IV) Indoor Air Sampling and Analysis and Appendix H: Occupied Dwelling Questionnaire

Although the Ohio EPA appreciates EPA's efforts to address the need to identify indoor air emission sources of target VOCs in the dwelling, it is still a highly problematic issue. We look forward to any further guidance in this area.